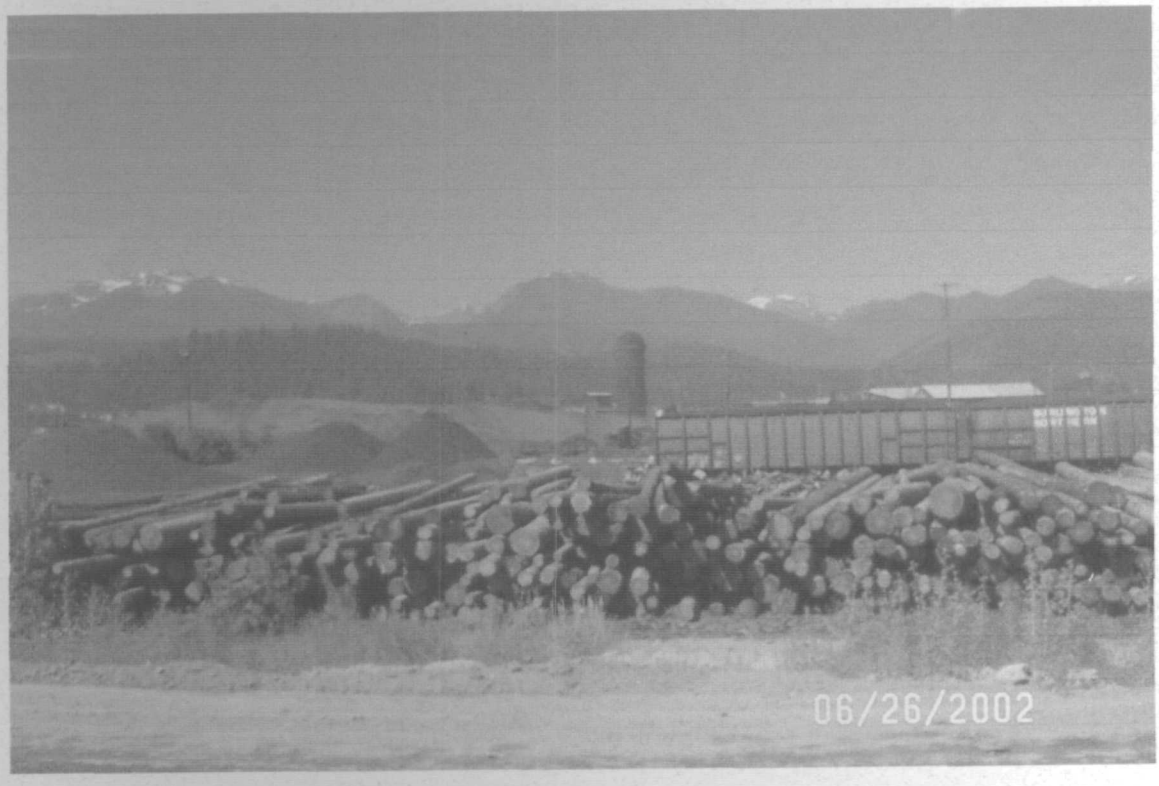
CDM

Contaminant Screening Study
Libby Asbestos Site, Operable Unit 4
Libby, Montana

Final Sampling and Analysis Plan Addendum for the Stimson Lumber Company Area

August 2002



Sampling and Analysis Plan Addendum

Response Action Contract
for Remedial, Enforcement Oversight, and Non-Time
Critical Removal Activities at Sites of Release or
Threatened Release of Hazardous Substances
in EPA Region VIII

U.S. EPA Contract No. 68-W5-0022

Final Sampling and Analysis Plan Addendum for the Stimson Lumber Company Area, Contaminant Screening Study, Libby Asbestos Site, Operable Unit 4

August 30, 2002

Work Assignment No.: 116-RIRI-08BC
Document Control No.: 3282-116-PP-SAMP-15483

Prepared for:
U.S. Environmental Protection Agency
Region VIII
999 18th Street, Suite 500
Denver, Colorado 80202

Prepared by:
CDM
1331 17th Street, Suite 1050
Denver, Colorado 80202

Response Action Contract
for Remedial, Enforcement Oversight, and Non-Time
Critical Removal Activities at Sites of Release or
Threatened Release of Hazardous Substances
in EPA Region VIII

U.S. EPA Contract No. 68-W5-0022

Final Sampling and Analysis Plan Addendum for the Stimson Lumber Company Area, Contaminant Screening Study, Libby Asbestos Site, Operable Unit 4

Work Assignment No.: 116-RIRI-08BC

Prepared by: _____ Date: 8/29/02
Krista Lippoldt
CDM Quality Assurance Coordinator

Reviewed by: STEVEN D. FUNDINGSCAN Date: 8-29-02
Steven Fundingsland
CDM Project Scientist

Reviewed by: _____ Date: 8/29/02
George DeLullo
RAC VIII QA Manager

Approved by: _____ Date: 9/4/02
Jim Christiansen
EPA Region VIII Remedial Project Manager

DISTRIBUTION LIST

Jim Christiansen (3 copies)
EPA Remedial Project Manager
EPA Region VIII, Denver CO

Linda Newstrom (5 copies)
EPA Information Center
501 Mineral Avenue
Libby, MT

Wendy Thomi (1 copy)
EPA Community Involvement Coordinator
EPA Region VIII, Helena, MT

Craig French (1 copy)
Montana Department of Environmental Quality
Helena, MT

John McGuiggin (1 copy)
Volpe Center Project Manager
Volpe Center, Cambridge, MA

Tim Wall (1 copy)
CDM Libby Project Manager
CDM Cambridge, MA

David Schroeder (5 copies)
CDM Field Office
CDM Libby, MT

Jeff Montera (3 copies)
CDM Remedial Project Manager
CDM Denver, CO

CDM Project File
CDM Denver, CO

Contents

Acronyms

bgs	below ground surface
CDM	CDM Federal Programs Corporation
CSS	Contaminant Screening Study
EPA	U.S. Environmental Protection Agency
ft	feet/foot
GPS	global positioning system
IR	infrared
MCS	MCS Environmental
OSHA	Occupational Safety and Health Administration
PES	Pacific Environmental Services, Inc.
pt	point
QC	quality control
SAP	sampling and analysis plan
SEM	scanning electron microscopy
Site	Stimson Lumber Company and area
SOPs	standard operating procedures

Section 1
Introduction

This addendum outlines the site-specific requirements necessary to conduct the contaminant screening study (CSS) at the Stimson Lumber Company and adjacent area (Site). All rationale, data quality objectives, quality assurance procedures, and standard operating procedures (SOPs) from the CSS sampling and analysis plan (SAP) still apply (CDM Federal Programs Corporation [CDM] 2002). Air sampling will also be conducted at the Site. All air sampling will be conducted in accordance with the Sampling and Analysis Plan, Stimson Lumber Company, Libby, MT., Libby Asbestos Project, August 2002 (Pacific Environmental Services, Inc. [PES]).

1.1 Site Location

The Stimson Lumber Company facility is situated in the eastern section of Libby, Montana on U.S. Highway 2 South. Portions of the Stimson Lumber Company facilities are located on land formerly used in the production of vermiculite insulation from ore. Vermiculite insulation was installed in structures currently occupied by Stimson Lumber Company employees.

The Site is currently owned by Stimson Lumber Company and other private parties. The majority of the Site is currently used for the manufacturing of plywood board. The Site is approximately 200 acres in size and is occupied by various buildings, processing plants, and storage sheds. For purposes of this investigation, the Site has been divided into eight subareas (Figure 1-1) as follows:

1. Former Popping Plant
2. Railroad Spur
3. Lumber Yard
4. Log Storage Yard
5. Southwest Area
6. Former Champion International Tree Nursery
7. Sprinkler Field
8. Superfund Site

These divisions were made based on assumed contaminant concentrations, land use, and environmental setting. During this investigation, no field activities will be conducted within the Sprinkler Field or Superfund Site subareas and, therefore, these subareas will not be discussed further in this addendum.

1.2 Site History

A Site visit (meeting) was conducted on September 28, 2001 by Mr. David Schroeder (CDM site manager), Mr. Greg Parana (PES field manager), and Dr. Chris Weis (U.S. Environmental Protection Agency [EPA] regional toxicologist). Stimson Lumber Company personnel present during this meeting included Mr. Fred Sturgess (Libby

complex manager), Ms. Veronica Bovee (health and safety coordinator), Mr. John Chopot (environmental manager), and Mr. Barry Brown (local union #2581 president). The Site meeting included interviews with current employees and a walk-through of three subareas (Former Popping Plant, Railroad Spur, and Former Champion International Tree Nursery), the central maintenance building, and the plywood plant.

The unpaved parking area used by Stimson Lumber Company employees (part of the Former Popping Plant subarea) was once used as an aboveground storage area for uncontainerized vermiculite ore. Vermiculite ore was stockpiled directly on the native soil surface and may have contaminated the area with measurable amounts of asbestos mineral fibers. The area was converted to a parking lot in 1990.

The Railroad Spur subarea is located near the Former Popping Plant location. This subarea was used for shipping raw and processed vermiculite material to and from the Site. It is suspected that this section of the railroad is contaminated with Libby asbestos from loading/unloading operations and transportation.

A landscaping nursery (i.e., Former Champion International Tree Nursery subarea) was previously located along the southern boundary of the Site. It is believed that un-exfoliated, or raw vermiculite product, was introduced to this area for use as a growth media and fill material. Currently the subarea remains a vacant lot with sparse vegetation. The lot is currently used to stockpile log yard debris collected from 1991 through 1997.

The central maintenance building (located in the Southwest Area subarea) is currently insulated with vermiculite insulation. This structure is equipped with a large gantry crane that traverses the length of the building. Movement of this crane causes vibration within the structure and release of small amounts of vermiculite insulation from around seams and joints of the clapboard walls.

The plywood plant (part of the Stimson Lumber Company subarea) is currently used for processing plywood. According to historical records, vermiculite insulation was used as an insulator for the plywood dryers. The Big Dryer #1 is the dryer of concern. According to Stimson Lumber Company employees, the Big Dryer #1 was modified in 1986-87 and it is believed that vermiculite material was added to the concrete, as well as sandwiched between the top of the dryer and the concrete layer. The Little Dryer #2 was modified in 1996 and does not contain any vermiculite material.

1.3 Previous Investigation

At the request of Stimson Lumber Company, MCS Environmental (MCS) performed industrial hygiene sampling to determine the potential exposure of Stimson Lumber Company employees to residual asbestos. In addition, soil and bulk samples were collected from various locations around the Site, including the central maintenance building, Former Champion International Tree Nursery subarea, and the gravel

parking lot (part of the Former Popping Plant subarea). Air samples taken within the central maintenance building and the plywood plant revealed concentrations of Libby asbestos below Occupational Safety and Health Administration (OSHA) regulations. While analysis of soils collected from the gravel parking lot were all non-detects, soil collected from the Former Champion International Tree Nursery subarea had concentrations of Libby asbestos as high as 5 percent. Analytical results of samples previously collected in areas of concern associated with this sampling plan are included in Attachment 1.

1.4 Objectives

This addendum has been generated to present a site-specific sampling plan for conducting the CSS at the Site. The objective of this investigation is to determine the presence or absence of Libby amphibole in soils associated with the Site.

Section 2
Field Activities

Field activities at the Site consist of verbal interviews, visual inspections, and surface and subsurface soil sampling. The verbal interviews and visual inspections have already been conducted, and the information is included in Section 1.1.

Surface and subsurface soil samples will be collected from all subareas in accordance with this addendum. For this investigation, the following number of primary (i.e., non-quality control [QC]) samples will collected:

SUBAREA	PRIMARY SURFACE SOIL SAMPLES	PRIMARY SUBSURFACE SOIL SAMPLES
1. Former Popping Plant	15	6
2. Railroad Spur	~20	0
3. Lumber Yard	24	5
4. Log Storage Yard	26	5
5. Southwest Area	23	4
6. Former Champion International Tree Nursery	14	7
7. Sprinkler Field	0	0
8. Superfund Area	0	0
Total	122	27

In addition to the above primary samples, the QC samples identified in the CSS SAP (CDM 2002) will be collected (i.e., duplicates, rinsates, equipment blanks, etc.) at a rate of one per 20, as follows:

DUPLICATES		EQUIPMENT BLANKS		RINSATES	
Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
7	2	7	2	7	2
Total = 9		Total = 9		Total = 9	

The soil sampling process will involve the following steps:

- Locate the predetermined sample locations and select composite sample locations
- Collect samples from composite locations
- Complete the sample field forms included in Attachment 2 (e.g., record subsample locations) and sketch additional structures, features, etc. not already on the subarea site maps
- Decontaminate all nondisposable sampling equipment

2.1 Sample Locations and Rationale

Sample locations are mapped on each of the subarea figures (Figures 2-1 through 2-6), with the coordinates listed next them (no samples will be collected in the Sprinkler Field or Superfund Site subareas). Sample location rationale is discussed in the following subsections. Each coordinate set will be located using the navigation function of the global positioning system (GPS) equipment. Once located, the coordinates will be QC checked by a second field member. If the sample location needs to be moved, the new coordinates will be recorded. This location will be considered the center subsample location. Each sample will be a composite of five subsamples, one from the center location and four from 10 feet (ft) away from the center in each of four directions (i.e., north, south, east, and west) (Figure 2-1). The exception to this type of compositing is for samples located near railroad tracks. For these samples, one subsample will be collected from the edge of the ballast nearest the location identified on the map and two other subsamples will be located 10 ft away, parallel to the tracks and also at the edge of the ballast (Figure 2-2).

If any sample location identified on the figures is not accessible due to an obstacle(s), the location will be moved but will stay as close to the mapped location as possible. If the location must be moved more than 100 ft, a sample will not be collected at that sample location because this would put sample locations too close to each other. If any of the subsample locations cannot be accessed at 10 ft away from the center subsample, the subsample location will be moved to between 5 to 25 ft away from the

center location. If it is still implausible to collect a subsample in that direction, it will be discarded as a subsample location, and the other directions will be subsampled, if possible. If the only subsample location accessible is the center, then the sample will be collected from that one location and no compositing will be conducted. The following paragraphs detail the horizontal locations for the soil samples and the rationale for these locations.

2.1.1 Former Popping Plant

The Former Popping Plant subarea was divided using 50 ft grids (Figure 2-1). It was assumed for this subarea that the highest contamination was near the interior of the subarea. Therefore, the majority of the surface soil sample locations were spaced approximately evenly around the edge of the subarea, with a few located in the interior. The perimeter sample locations were chosen to aid in the determination of the outer boundaries of the asbestos contamination, whereas, the interior sample locations were selected to verify interior contamination. Subsurface soil samples will be collected at approximately one-third of the sample locations to determine the nature and vertical extent of contamination and because contamination is assumed to be concentrated in this area.

2.1.2 Railroad Spur

The Railroad Spur subarea was segmented into 200 ft intervals. At each interval, two sampling locations have been identified, one on each side of the railroad tracks. Once the tracks split into four sets, the samples will be on the outer sides of the two furthest east tracks. The initial/center sample location will be at the edge of the ballast nearest the coordinates listed on Figure 2-2 and continuing every 200 ft off the map along the railroad tracks until the tracks turn east. Two more subsamples will be collected from 10 ft on each side of the center location at the edge of the ballast. All three subsamples will be composited at each sample location listed on the subarea figure and every 200 ft off the map until the tracks turn east. Any large chunks of ballast material will be removed from the sample. No subsurface samples will be collected from this subarea because it has been assumed that any asbestos present from loading/unloading and/or transportation of ore will be at or near the surface. The sample locations in this subarea were selected to determine if any Libby asbestos is present near the railroad tracks that may have been associated with its transportation.

2.1.3 Lumber Yard, Log Storage Yard, and Southwest Area Subareas

For the Lumber Yard (Figure 2-3), Log Storage Yard (Figure 2-4), and Southwest Area (Figure 2-5), the subareas were divided into 400-ft grid squares. The center of each square that was more than half in the Site was determined to be a surface soil sample location, if accessible. In the Lumber Yard subarea, several locations were shifted from grid centers based on professional judgement because of the increased amount of activity and structures in this subarea. The three sample locations in the Lumber

Yard, between 5th Street and Champion Haul Road should be located in the hayfield. If the coordinates in the figure do not put the sample in the hayfield, it should be moved until it is located within the hayfield. Also, several grid centers in the Lumber Yard will not be sampled because of inaccessibility (i.e., structures or activities to dense). All sample locations in these subareas were chosen to generally characterize the nature and extent of Libby asbestos contamination throughout the subareas.

Subsurface soil samples will also be collected at approximately 20 percent of the surface soil sample locations. These locations were determined by placing them at random locations throughout the subareas, with a few biased toward the Former Champion International Tree Nursery subarea.

2.1.4 Former Champion International Tree Nursery

The Former Champion International Tree Nursery subarea was partitioned using a 100-ft grid system. Samples will be collected around the perimeter of the subarea approximately equidistant except for the south edge, which is the outer border of the Site. A higher density of samples will be collected in this area because it is the edge of the Site and samples further south will not be collected. These perimeter surface sample locations were selected to determine the horizontal extent of potential contamination around the nursery area. Several surface samples will also be collected in the interior of the subarea to verify high contamination areas. Sample locations are presented in Figure 2-6. Subsurface samples will also be collected at approximately one-half of the surface sample locations to aid in the determination of vertical extent of contamination. This was decided because contamination is assumed to be concentrated in this subarea. Also because of potential high levels of contamination in this area, all personnel will be in Level C during sampling activities.

2.2 Sample Collection

Surface soil samples will be collected from all sample locations, and subsurface soil samples will be collected from approximately one-third of the sample locations in the Former Popping Plant subarea, one-half of the locations in the Former Champion International Tree Nursery subarea, none of the sampling locations in the Railroad Spur area, and approximately 20 percent of the remaining surface soil locations. The locations of these samples are provided in Figures 2-1 through 2-6. Sampling is expected to last approximately 12 days.

Surface soil samples will extend from the surface to approximately 6 inches below ground surface (bgs). All surface samples will be collected in accordance with procedures identified in the CSS SAP (CDM 2002). Subsurface soil samples will be collected from a composite of the 4 to 5 foot bgs section using a Geoprobe™ with a 5-ft macrocore with inner plastic liner. All subsurface soil samples will be collected in accordance with CDM SOP 3-1, Geoprobe™ Sampling (Attachment 3). Dust will be controlled by spraying deionized water around the drill area, if necessary. CDM personnel will be responsible for clearing utilities for each subsurface location prior to

drilling. The surface samples will be collected to identify surficial contamination while the 4-5 ft samples will be collected to determine if any historical deposition of Libby asbestos has occurred.

All samples (surface and subsurface) will consist of a 5-point (pt) composite sample except any sample collected near a railroad track (e.g., the samples collected in the Railroad Spur subarea, Figure 2-2). The 5-pt composite sample will consist of a center subsample located at the coordinates listed in each figure and four additional subsamples approximately 10 ft on each directional side of the center subsample (i.e., north, south, east, and west). Samples collected near a railroad track will consist of a center subsample at the edge of the railroad track ballast as close to the coordinates identified in the appropriate figure and two subsamples collected at the edge of the ballast 10 ft in each direction parallel to the tracks. Although surface and subsurface soil samples will be co-located, they will be individually collected (i.e., individual surface and subsurface composite samples).

Quality control samples will be collected in accordance with the CSS SAP except rinsates and equipment blanks will be collected at a rate of one per 20 normal samples (e.g., instead of one per day) (CDM 2002).

2.3 Field Form Completion and Feature/Structure Sketch

For each sample collected, a field sample data sheet for soil (Attachment 2) will be completed. Each form will identify the samplers, sample identification numbers, and location of subsamples and will be completed in accordance with SOP CDM-LIBBY-03, Completion of Field Sample Data Sheets and Addendum No. 1. The sample identification number associated with the sample point will be in the form of SP-######. For each sample collected, a GPS point will be recorded from the center location of the subsamples. The other subsample locations will be identified using a compass and measuring instrument. For each of these non-center subsample locations, the distance and direction from the center location will be recorded. Any obstacles or reasons for movement or deletion of a sample or subsample will be recorded on the field form. Additionally, any structure or other relevant feature (e.g., lumber piles, roads, drainage ditches, utility poles, etc.) not already on the subarea figure will be sketched onto a copy of the appropriate figure.

2.4 Decontamination

All decontamination will be conducted in accordance with the CSS SAP. The CSS SAP does not describe decontamination of Geoprobe™ equipment. This equipment (e.g., the macrocore) will also be decontaminated in accordance with CDM SOP 4-5, Field Equipment Decontamination at Nonradioactive Sites. All non-disposable sampling equipment will be decontaminated between sample locations but will not be decontaminated between subsample locations.

Section 3
Sample Analysis and Data Validation

Soil samples will be analyzed for Libby asbestos by the infrared spectroscopy (IR) method (ISSI-LIBBY-02 located in the CSS SAP). Depending on sample results, a sample split may be submitted for analysis using the scanning electron microscopy (SEM) method (Asbestos Analysis of Soil by Scanning Microscopy and Energy Dispersive X-Ray Spectroscopy, Revision 0, May 6, 2002). This determination will be made by the CDM laboratory coordinator. All data validation and evaluation will be conducted in accordance with Section 7 of the CSS SAP (CDM 2002).

Section 4
References

CDM. 2002. Final Sampling and Analysis Plan, Remedial Investigation, Contaminant Screening Study. April.

TARGET SHEET

EPA REGION VIII

SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOCUMENT NUMBER: 2009531

SITE NAME: LIBBY ASBESTOS

DOCUMENT DATE: 08/01/2002

DOCUMENT NOT SCANNED

Due to one of the following reasons:

- ☐ PHOTOGRAPHS
- ☐ 3-DIMENSIONAL
- ☑ OVERSIZED
- ☐ AUDIO/VISUAL
- ☐ PERMANENTLY BOUND DOCUMENTS
- ☐ POOR LEGIBILITY
- ☐ OTHER
- ☐ NOT AVAILABLE
- ☐ TYPES OF DOCUMENTS NOT TO BE SCANNED
  (Data Packages, Data Validation, Sampling Data, CBI, Chain of Custody)

DOCUMENT DESCRIPTION:

FIGURE 1-1 Stimson Lumber Company Site Map

Contact the Superfund Records Center to view available document.
(303) 312-6473

T:\Cadd\3280-RAC8\116-LIBBY\STIMSON\SECTION1.DWG 08-05-02

N 17586235.56
E 1994364.60

N 17586135.37
E 1994342.80

N 17586299.97
E 1994299.28

N 17586177.57
E 1994308.53

N 17586097.85
E 1994271.05

N 17586002.43
E 1994286.98

N 17586285.46
E 1994208.14

N 17586173.07
E 1994208.64

N 17586070.92
E 1994163.18

N 17585996.99
E 1994166.05

N 17586278.53
E 1994121.42

N 17586192.44
E 1994082.77

N 17585992.62
E 1994068.95

N 17586090.36
E 1994034.28

N 17585989.04
E 1993989.56

FORMER POPPING PLANT

PLANT PARKING

OFFICE

PARKING

LIBBY CITY HA

FITNESS TRAININ CENTER

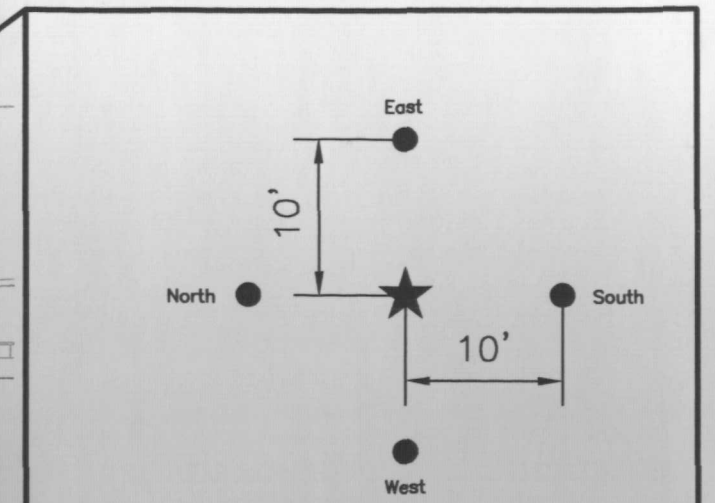
PARKING

PARKING

BOULEVARD

76

78



TYPICAL SUBSAMPLING CONFIGURATION

LEGEND

★ Surface Sample Only

Surface and Subsurface Sample

N

0 100

SCALE IN FEET

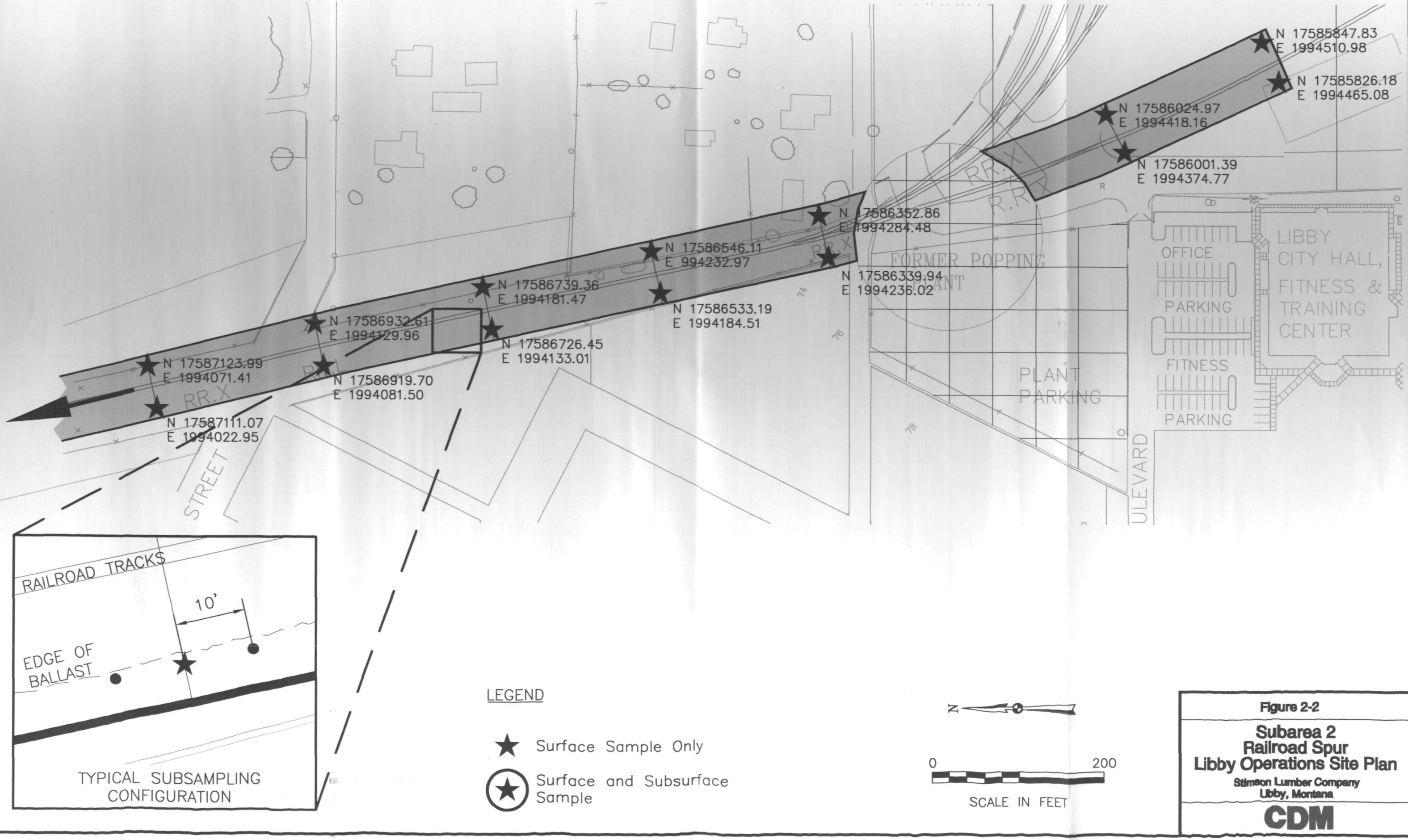
Figure 2-1

Subarea 1
Former Popping Plant
Libby Operations Site Plan

Stimson Lumber Company
Libby, Montana

CDM

T:\Cadd\3280-RAC8\116-LIBBY\STIMSON\SECTION2.DWG 08-28-02



LEGEND

★ Surface Sample Only

★ Surface and Subsurface Sample

N

0 200

SCALE IN FEET

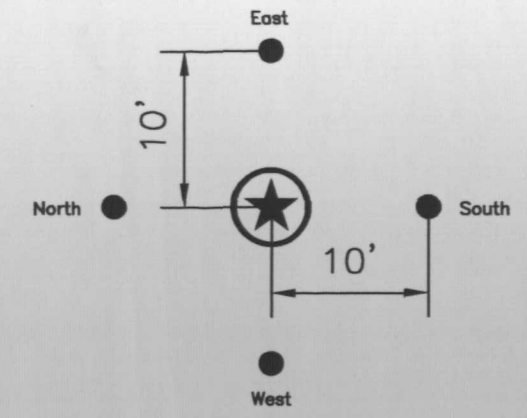
Figure 2-2

Subarea 2
Railroad Spur
Libby Operations Site Plan

Stimson Lumber Company
Libby, Montana

CDM

T:\Cadd\3280-RAC8\116-LIBBY\STIMSON\SECTION3.DWG 08-28-02



TYPICAL SUBSAMPLING CONFIGURATION

LEGEND

★ Surface Sample Only

Ⓢ Surface and Subsurface Sample

NOTE:

ALL SAMPLE LOCATIONS NEAR A RAILROAD TRACK WILL FOLLOW THE SAMPLING PROCEDURES FOR THE RAILROAD SPUR AREA

N

0 600

SCALE IN FEET

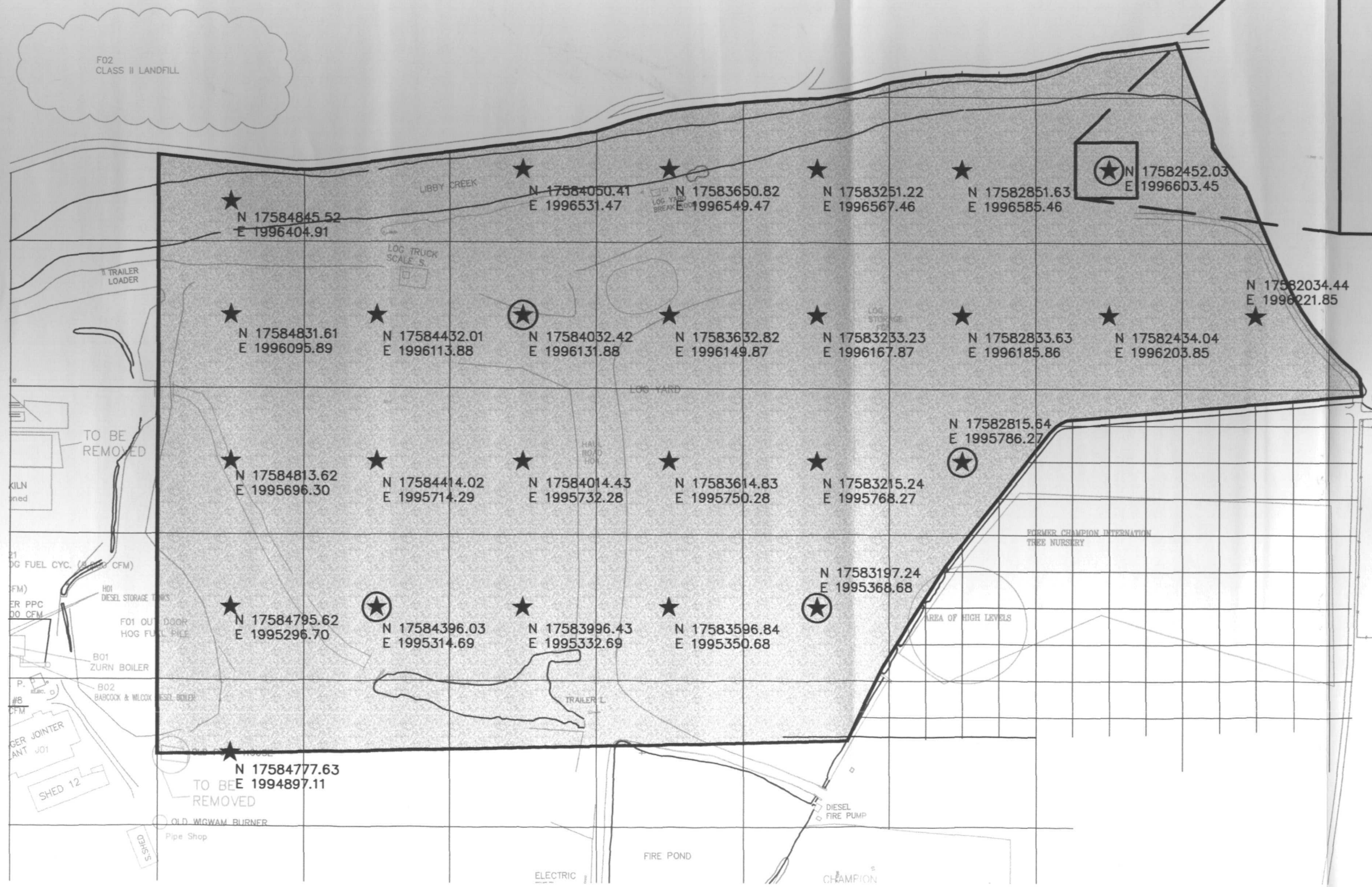
Figure 2-3

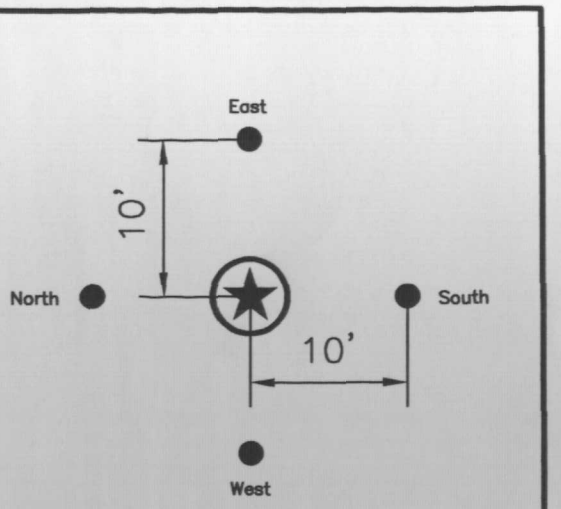
Subarea 3
Lumber Yard
Libby Operations Site Plan

Stimson Lumber Company
Libby, Montana

CDM

T:\Cadd\3280-RAC8\116-LIBBY\STIMSON\SECTION4.DWG 08-08-02





TYPICAL SUBSAMPLING CONFIGURATION

LEGEND

★ Surface Sample Only

★ Surface and Subsurface Sample

N

0 600

SCALE IN FEET

Figure 2-4

Subarea 4
Log Storage Yard
Libby Operations Site Plan

Stimson Lumber Company
Libby, Montana

CDM

T:\Cadd\3280-RAC8\116-LIBBY\STIMSON\SECTION5.DWG 08-28-02

B01
ZURN BOILER

B02
BABCOCK & WILCOX DIESEL BOILER

TRAILER L.

OLD PUMP HOUSE
TO BE REMOVED

OLD WIGWAM BURNER

Pipe Shop

N 17584378.03
E 1994915.10

N 17583978.44
E 1994933.09

N 17583578.84
E 1994951.09

N 17582780.40
E 1995003.59

N 17582380.24
E 1995009.12

N 17581980.64
E 1995027.12

DIESEL FIRE PUMP

FIRE POND

N 17583960.44
E 1994533.50

ELEC. FIRE PUMPS

CHAMPION INTERNATIONAL CORPORATION

SUPERFUND SITE

N 17584759.63
E 1994497.51

N 17584360.04
E 1994515.50

N 17582561.86
E 1994596.48

Abandoned

LUMBER KILNS

FIRE HALL

ELECTRIC MOTOR SHED

BIO TREAT PLANT

N 17584741.64
E 1994097.92

BUILDING CONTAINING ZONLITE INSULATION

N 17584342.05
E 1994115.91

N 17583943.52
E 1994157.63

N 17583542.85
E 1994151.90

N 17583143.26
E 1994169.89

N 17582743.66
E 1994187.88

MOBILE SHOP

PURCH. WAREH.

ENG. DEPT

STEEL

CHAMPION INT'L

STORAGE SHEDS

TRUCK BARN

MTCE. DEPT

F08 EAST FAN C.M. SHOP (750 CFM)

F09 WEST FAN C.M. SHOP (650 CFM)

P12A C.M. SHOP E. CYC. (800 CFM)

P12B C.M. SHOP W. CYC. (800 CFM)

Propane Tank

LIFT TK BARN

N 17583924.46
E 1993734.31

N 17583524.86
E 1993752.30

N 17583725.27
E 1993770.30

N 17582725.67
E 1993788.29

N 17582326.08
E 1993806.28

THIS AREA OWNED BY TONY BERGET

THIS AREA OWNED BY CHAMPION INTERNATIONAL (SUPERFUND SITE)

TRUCK PORT

H02 GAS TANK

PARKING LOT

Main Office

CONTRACTOR'S PARKING LOT

N 17583906.46
E 1993334.71

N 17583506.87
E 1993352.71

ARKING LOT

HWY 2

HWY 2

LEGEND

★ Surface Sample Only

Surface and Subsurface Sample

N

0 600

SCALE IN FEET

East
10'
North
South
10'
West

TYPICAL SUBSAMPLING CONFIGURATION

Figure 2-5

Subarea 5
Southwest Area
Libby Operations Site Plan

Stimson Lumber Company
Libby, Montana

CDM

T:\Cadd\3280-RAC8\116-LIBBY\STIMSON\SECTION6.DWG 08-08-02

LOG
STORAGE
F05

N 17581773.43
E 1995985.05

HEAD GATE

N 17582170.94
E 1995945.07

N 17582570.05
E 1995848.38

N 17581764.28
E 1995781.69

FORMER CHAMPION INTERNATIONAL
TREE NURSERY

N 17582354.85
E 1995556.76

N 17582849.31
E 1995432.92

N 17581758.66
E 1995581.57

N 17581950.76
E 1995474.86

AREA OF HIGH LEVELS

N 17582645.55
E 1995343.47

N 17581751.28
E 1995379.83

N 17581740.73
E 1995183.32

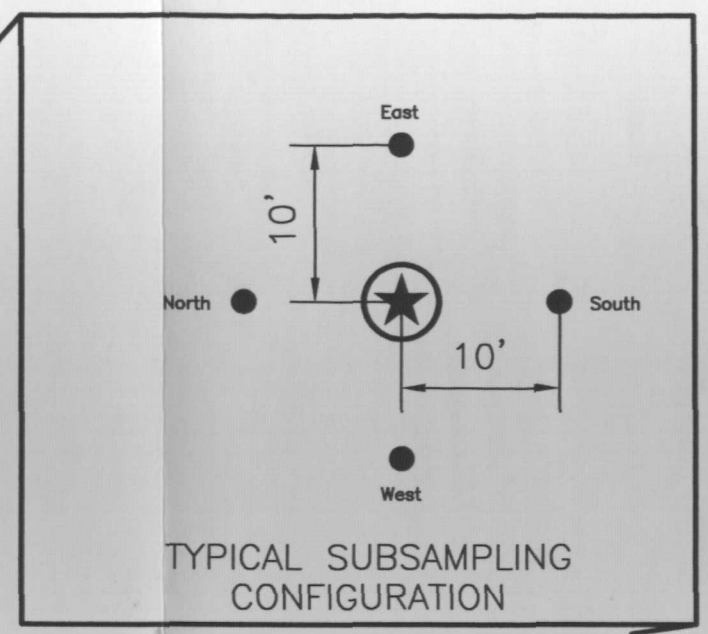
N 17583045.86
E 1995036.25

N 17582585.16
E 1995068.88

N 17582181.80
E 1995092.14

DIESEL
FIRE PUMP

CHAMPION
INTERNATIONAL
CORPORATION



TYPICAL SUBSAMPLING CONFIGURATION

LEGEND

★ Surface Sample Only

Surface and Subsurface Sample

N

0 400

SCALE IN FEET

Figure 2-6

Subarea 6 - Former Champion International Tree Nursery
Libby Operations Site Plan
Stimson Lumber Company
Libby, Montana

CDM

TARGET SHEET

EPA REGION VIII

SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOCUMENT NUMBER: 2009531

SITE NAME: LIBBY ASBESTOS

DOCUMENT DATE: 08/01/2002

DOCUMENT NOT SCANNED

Due to one of the following reasons:

☐ PHOTOGRAPHS

☐ 3-DIMENSIONAL

☐ OVERSIZED

☐ AUDIO/VISUAL

☐ PERMANENTLY BOUND DOCUMENTS

☐ POOR LEGIBILITY

☐ OTHER

☐ NOT AVAILABLE

☑ TYPES OF DOCUMENTS NOT TO BE SCANNED
(Data Packages, Data Validation, Sampling Data, CBI, Chain of Custody)

DOCUMENT DESCRIPTION:

ATTACHMENT 1 Analytical Results from Previously Collected Samples at the Stimson Lumber Company Area

Contact the Superfund Records Center to view available document.
(303) 312-6473

Attachment 2
Field Sample Data Sheet for Soil and SOP CDM-LIBBY-03 Addendum No. 1

Sheet No.: CSS (S) - _____

CONTAMINANT SCREENING STUDY

FIELD SAMPLE DATA SHEET FOR SOIL

Scenario No.: _____ Field Logbook No: _____ Page No: _____ Sampling Date: _____

Address: _____ Owner: _____

Land Use: (circle) Residential School Commercial Mining Roadway Other ( )

Sampling Team: (circle) CDM PES Other _____ Names: _____

Data Item	Sample 1	Sample 2	Sample 3
Index ID			
Location ID			
Sample Group			
Location Description (circle)	Back yard Front yard Side yard Other _____	Back yard Front yard Side yard Other _____	Back yard Front yard Side yard Other _____
Category (circle)	FS FD_____	FS FD_____	FS FD _____
Matrix Type (Surface soil unless other wise noted)	Surface Soil Other _____	Surface Soil Other _____	Surface Soil Other _____
Type (circle)	Grab Comp. # subsamples _____	Grab Comp. # subsamples _____	Grab Comp. # subsamples _____
Sample Time			
Top Depth (in.)			
Bottom Depth (in.)			
Grid, Quadrant, Section			
Field Comments			
	Entered ___ Validated ___	Entered ___ Validated ___	Entered ___ Validated ___

Field Team	Initial
Completed by	
QC by	

Addendum to Completion of Field Sample Data Sheets

Project: Libby Asbestos Remedial Investigation - Contaminant Screening Study (CSS

Project Number: 3282-116

Specific Site: Stimson Lumber Company Area

Document No.: CDM-LIBBY-03 ADDENDUM NO. 1

Project Manager: [signature] Date: 8/29/02

Technical Reviewer: [signature] Date: 8/29/02

EPA Approval: _____ Date: _____

The field sample data sheet (FSDS) must be completed using the original SOP and this Addendum for the Stimson Lumber Company Area.

All categories will be completed in accordance with the original SOP with the following changes and/or additions:

Address: The center sample coordinates. If center sample coordinates change (e.g., the subsurface sample center coordinates are different than the surface sample), then a new FSDS will be completed. Coordinates are to be entered in the following format:

N - Number, E - Number

Sample Group: The sample group for the Stimson Lumber Company Area soil samples do not have to be one of the list in the original SOP. The sample group should describe the surrounding area (e.g., forest, field, log yard, etc.).

Location Description: The subarea where the center sample is located.

Field Comments: The subsample locations should be identified here. Locations are to be entered in the following format:

1) Direction (e.g., N5°E), Feet from Center Sample (e.g., 12.5')
2) Direction (e.g., N80°E), Feet from Center Sample (e.g., 11')
3) Direction (e.g., N85°WE), Feet from Center Sample (e.g., 15')
4) Direction (e.g., S10°E), Feet from Center Sample (e.g., 19')

Also in this field, any obstacles should be noted along with reasons for moving a location or not collecting one of the four subsamples.

Attachment 3
CDM SOP 3-1, Geoprobe™ Sampling

CDM

GEOPROBE® SAMPLING

SOP: 3-1
Revision: 3
Date: June 20, 2001
Page 1 of 15

Prepared: Kent Hankinson Technical Review: Mitch Goldberg

QA Review: David O. Johnson Approved: _____ Signature/Date

Issued: _____ Signature/Date

1.0 OBJECTIVE

The objective of this standard operating procedure (SOP) is to define the requirements for collecting soil, soil gas, and groundwater samples using the Geoprobe® sampling system. Geoprobe® is a trade name proprietary to Geoprobe Systems of Salina, Kansas.

2.0 BACKGROUND

2.1 Discussion

The Geoprobe® unit consists of a hydraulically operated, hammer device mounted in the back of a van or pickup truck (Figure 1). The Geoprobe® system hydraulically advances small-diameter, hollow rods to the desired sampling depth. The specific type of Geoprobe® sampling equipment for soil, soil gas, and groundwater collection is then employed.

The use of Geoprobe® technology may be a cost-effective alternative to using conventional drilling techniques for collecting subsurface soil, soil gas, and groundwater samples depending on the site-specific geologic and hydrogeologic conditions and sample requirements. The Geoprobe® system is generally used to gather screening-level data. The site-specific sampling plans must consider such factors as soil types, presence of cobbles, depth to groundwater, quantity and depth of samples, site access and topography, data quality objectives (DQOs), analytical requirements, and waste handling and disposal requirements prior to selecting the use of the Geoprobe®.

Advantages of using the Geoprobe® include:

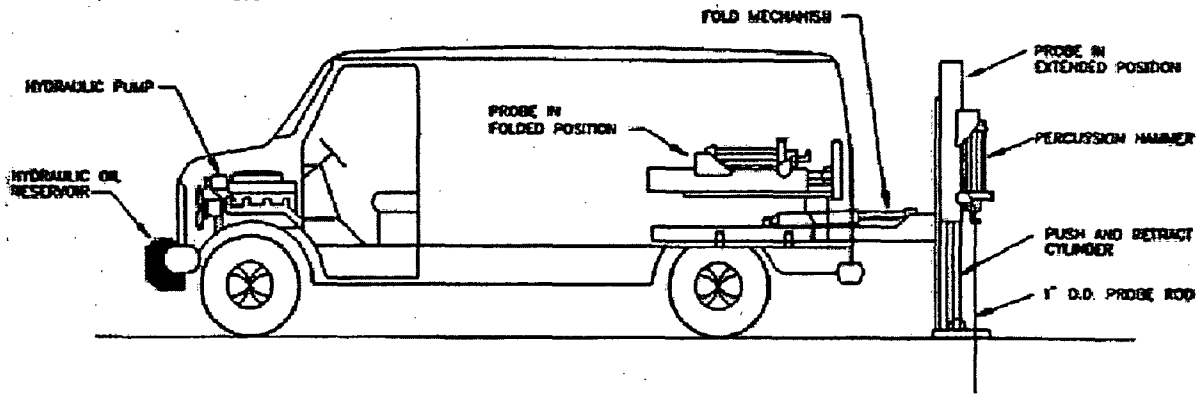
- Areas usually considered inaccessible by drill rigs because of overhead wires, steep slopes, size constraints, etc., may be accessed with the pickup truck or van-mounted Geoprobe®.
- Investigation-derived wastes such as soil cuttings and purge water are minimized with the Geoprobe® due to its small diameter rods and because it displaces soil horizontally, not vertically.

Cost savings over conventional drilling techniques may be realized. The Geoprobe® is rented/leased on a weekly or monthly basis or purchased for a fixed price as opposed to drilling subcontractors who are generally compensated based on the footage drilled; the Geoprobe® may be operated by field personnel rather than subcontractors. A cost evaluation based on project-specific requirements and site conditions should be conducted to determine the most cost-effective method for a particular project.

FIGURE 1
GEOPROBE® UNIT

BASICS

- HYDRAULICALLY POWERED PROBE OPERATES FROM HYDRAULIC SYSTEM DRIVEN FROM THE VEHICLE OR AN AUXILIARY ENGINE.
- REMOTE VEHICLE IGNITION ALLOWS OPERATORS TO START VEHICLE ENGINE FROM REAR COMPARTMENT.
- BELT DRIVEN HYDRAULIC PUMP SUPPLIES 10 GPM AT 2000 RPM, 2250 PSI OPERATING PRESSURE.
- PROBE UNIT FOLDS FOR TRANSPORT AND SETS UP AGAIN IN SECONDS.
- UTILIZES STATIC FORCE (WEIGHT OF VEHICLE) AND PERCUSSION TO ADVANCE PROBING TOOLS.
- POWERFUL 8 HP HYDRAULIC HAMMER DELIVERS OVER 1800 BLOWS PER MINUTE.
- HAMMER FEATURES 0–300 RPM LH DIRECTIONAL ROTARY FUNCTION FOR DRILLING SURFACE PAVEMENTS.
- PROBE HAS GREATER THAN 12,000 LBS. OF PULLING CAPACITY.
- DRIVES SMALL DIAMETER (1" O.D. – 1.6" O.D.) PROBING TOOLS TO DEPTHS LIMITED ONLY BY SOIL TYPE AND DEPTH TO BEDROCK, TYPICALLY TO OVER THIRTY FEET.



Two people are required to operate the Geoprobe® and conduct sampling and record keeping activities. Safety considerations should be addressed when operating the Geoprobe®. A safety hazard is present whenever the Geoprobe® is operated. The hydraulic system operates with a fluid pressure of over 2,000 pounds per square inch (psi). A leaking hose may produce a stream of hydraulic fluid with sufficient pressure to penetrate skin. Therefore, periodic checks of the hydraulic lines and hoses should be conducted to ensure they are in good condition and connections are tight. Do not attempt to repair or tighten hoses with the engine running and the system under pressure. Use paper or cardboard to check for leaks.

2.2 Definitions

Geoprobe® - A hydraulically operated, hammer device installed in the back of a van or pickup truck, used to advance a hollow-stem rod into the soil for the purpose of collecting soil, soil gas, or groundwater samples.

Probe-Drive Sampler - A sampling device, similar to a split-spoon sampler, used to collect soil samples with a Geoprobe® rig. Three types of soil samplers are available: standard (in 10- and 24-inch lengths), large bore (with an acetate liner), and Kansas stainless.

Extension Rod - Stainless steel rod used to remove stop-pin and drive-point assembly.

Extension Rod Coupler - Stainless steel connector used to join sections of extension rods.

Drive Point - Solid steel retractable point used to advance sample collection device to the required sample depth.

Probe Rod - Hollow, flush-threaded, steel rod similar to a drill rod.

Stop-Pin - Steel plug that threads into the top of the drive cap to hold the drive point in place during advancement of the probe rods.

Drive Cap - Threaded, hardened-steel top cap that attaches to the top of the probe rod; used when advancing the probe rods with the hydraulic hammer.

Pull Cap - Threaded, hardened-steel top cap that attaches to the top of the probe rod; used when retracting the probe rods.

Extruder Rack and Piston - A device used in conjunction with the Geoprobe® to force soil sample volume out of the sample tube.

Screen Point Groundwater Sampler - A groundwater sampling device designed for use with the Geoprobe® consisting of a well screen encased in a perforated stainless steel sleeve.

Mill-slotted Well Rod and Point - A groundwater sampling device designed for use with the Geoprobe® consisting of a Geoprobe® probe rod with 15-mil slots, each 2" long x 0.020" wide.

Post-Run Tubing System (PRT) - The Geoprobe® soil vapor sampling system utilizes disposable polyethylene or Teflon® tubing (inserted into the probe rods at the desired sampling depth) and a vacuum.

Expendable Drive Point - Solid steel point attached to the end of the screen point groundwater sampler and PRT expendable point holder.

2.3 Associated Procedures

- CDM Federal SOP 1-2, Sample Custody
- CDM Federal SOP 1-5, Groundwater Sampling Using a Bailer
- CDM Federal SOP 1-6, Water Level Measurements
- CDM Federal SOP 2-1, Packaging and Shipping of Environmental Samples
- CDM Federal SOP 4-1, Field Logbook Content and Control
- CDM Federal SOP 4-3, Well Development and Purging
- CDM Federal SOP 4-5, Field Equipment Decontamination

3.0 RESPONSIBILITIES

Field Team Leader (FTL) - The FTL is responsible for ensuring that sampling efforts are conducted in accordance with this procedure, associated SOPs, and the site-specific plans.

Sampling Personnel - Field team members are responsible for conducting Geoprobe® sampling events in accordance with this procedure, all associated SOPs, and requirements as described in the site-specific plans.

4.0 REQUIRED EQUIPMENT

General

- Site-specific plans
- Field logbook, chain-of-custody forms, other forms for documenting sample shipment
- Indelible black or blue ink pens and markers
- Sample containers with labels and preservatives
- Insulated coolers
- Bagged ice or "blue ice"
- Plastic zip-top bags
- Waterproof sealing tape

- Temperature, conductivity, pH, dissolved oxygen, and turbidity meters (with clean beakers or other appropriate containers), as required by the site-specific plans
- Monitoring/Screening instruments as required by the site-specific health and safety plan or sampling plan
- Decontamination supplies, as required by SOP 4-5
- Personal protective equipment (PPE), as required by the site-specific health and safety plan (at a minimum, hard hat, steel-toed shoes, safety glasses, and hearing protection are required)
- Latex or appropriate gloves
- Geoprobe® rig (van, truck, or skid-mounted) with the following:
  - Probe rods (1, 2, and 3-foot lengths)
  - Extension rods (1, 2, and 3-foot lengths), couplers, and handle
  - Piston stop pins (two each per rig, minimum)
  - Drive caps and pull caps (two each per rig, minimum)
  - Carbide-tipped drill bit for working in concrete- or asphalt-covered areas
  - O-rings

Geoprobe® Soil Sampling Equipment

- Extruder rack and piston (if soil is to be extruded into a sample container - otherwise, the steel sample tube with the Standard and Kansas Samplers or acetate liner with the Large Bore Sampler may be shipped to the laboratory, as indicated in the site-specific plans)
- Assembled soil samplers (i.e., Standard 10-inch or 24-inch Sampler, Kansas Stainless Sampler, or Large Bore Sampler - refer to the Geoprobe® Systems Equipment and Tools Catalog for specific parts for each sampler)

Geoprobe® Soil Gas Sampling Equipment

- Expendable drive points (one each per sample location, plus spares)
- Extension rod ram
- 3/8" Polyethylene (Teflon® lined) tubing and PRT adapter
- Vacuum or sampling system
- Syringe
- PRT adapter
- PRT expendable point holder

Geoprobe® Groundwater Sampling Equipment

- Expendable drive points (one each per sample location, plus spares)
- Mill-slotted well point or screen point groundwater sampler assemblies
- Extension rod ram
- 3/8" Polyethylene (Teflon® lined) tubing
- Check valves (if using Waterra system)
- Peristaltic pump
- Mini-bailer (and thin nylon line)

5.0 PROCEDURES

Procedures common to all three sampling methods are discussed below.

Prior to sampling:

- Arrange utility clearance.
- Decontaminate all Geoprobe® equipment according to SOP 4-5, Field Equipment Decontamination.
- Don the appropriate PPE as dictated by the site-specific health and safety plan.
- If the sampling site is in a concrete - or asphalt - covered area, drill a hole using the rotary function and a specially designed 1.5-inch or 2.0-inch diameter carbide-tipped drill bit. Otherwise, the area needs to be cleared of heavy underbrush and immediate overhead obstructions.

After sampling is completed:

- Thread the pull cap onto the top probe rod and retract the probe rods.
- Seal the borehole with sand, neat cement, or bentonite grout, if necessary.
- Record all appropriate data in the field logbook and the chain-of-custody forms as outlined in CDM Federal SOP 4-1 "Field Logbook Content and Control" and CDM Federal SOP 2-1 "Packaging and Shipping of Environmental Samples."
- Decontaminate the sampling equipment according to CDM Federal SOP 4-5 "Field Equipment."

5.1 Soil Sampling

Assembly

1. Assemble the sampling device as follows:
   - Screw the cutting shoe to the bottom end of the sample tube (unless using standard probe drive sampler which has built-in cutting edge).
   - Screw the piston tip onto the piston rod.
   - Screw the drive head onto the top end of the sample tube.
   - If using Teflon® liner, insert liner into sample tube.
   - Slide the piston rod into the sample tube, leaving the piston tip sticking out of bottom end of the sample tube.
   - Screw the piston stop pin onto the top end of the piston rod in a counter-clockwise direction.

2. Attach the assembled sampler onto the leading probe rod. A 12-inch probe rod is recommended to start the 24-inch standard and large bore samplers.

Probing

3. Thread the drive cap onto the top of the probe rod and advance the sampler. Replace the 12-inch rod with a 36-inch rod as soon as the top of the sampler is driven to within 6 inches of the ground surface.

4. Advance the sampler to the interval to be sampled using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.

Stop Pin Removal

5. Move the probe unit back from the top of the probe rods and remove the drive cap.

6. Lower the extension rods into the inside diameter of the probe rods using extension rod couplers to join the extension rods.

7. Attach the extension rod handle to the top extension rod and rotate the handle clockwise until the leading extension rod is screwed into the piston stop pin. Continue to rotate the handle clockwise until the stop pin disengages from the drive head.

8. Remove the extension rods and attached piston stop pin from the probe rods.

Sampling

9. Replace the drive cap, mark the top probe rod with a marker or tape at a distance above the ground equal to the length of the sample tube (either 12 or 24 inches).

10. Advance the probe rods using the hydraulic hammer the length of the sample tube (either 12 or 24 inches).

11. Replace the drive cap with the pull cap and retract the probe rod(s). Secure the rod(s) with a clamp or by hand during removal so they do not fall back down the resulting borehole.

12. Detach the sampler from the lead probe rod, verifying that sufficient sample volume was recovered (the length of sample contained within the tube is approximately equal to the length of exposed piston rod).

13. Disassemble the sampler. If the sample is to be analyzed for VOCs, then the sample tube or liner should be sealed immediately by placing a Teflon® septa over the ends and covering them with plastic caps.

14. If samples do not require VOC analysis, they may be extruded from the sampler and transferred to the sample jars specified in the site-specific plans or SOP 2-1 "Packaging and Shipping of Environmental Samples." Samples can be extruded by one of two methods:

- Using the Geoprobe® rig and the extruder rack (Figure 2), position the extruder rack on the foot of the Geoprobe® derrick; insert the sample tube into the extruder rack with cutting end up; and position the extruder piston, pushing the sample out of the sample tube using the "probe" function. Catch the sample as it exits beneath the extruder in a sample jar or stainless steel mixing bowl. Samples to be collected for VOCs will be collected directly from the sample tube into the sample jars.
- Lightly tap the side of the sample tube with a hammer while also lightly pushing the Piston Rod.

15. Label the sample liner or sample jars as required, securing the label by covering it with a piece of clear, waterproof tape.

16. Homogenize the sample in a stainless steel bowl with a stainless steel spoon or spatula. Transfer the sample from the bowl to the sample container.

17. Clean the outside of the sample jars and place individual samples into sealable bags and seal closure.

18. Place samples in a cooler containing ice, according to SOP 2-1 "Packaging and Shipping of Environmental Samples."

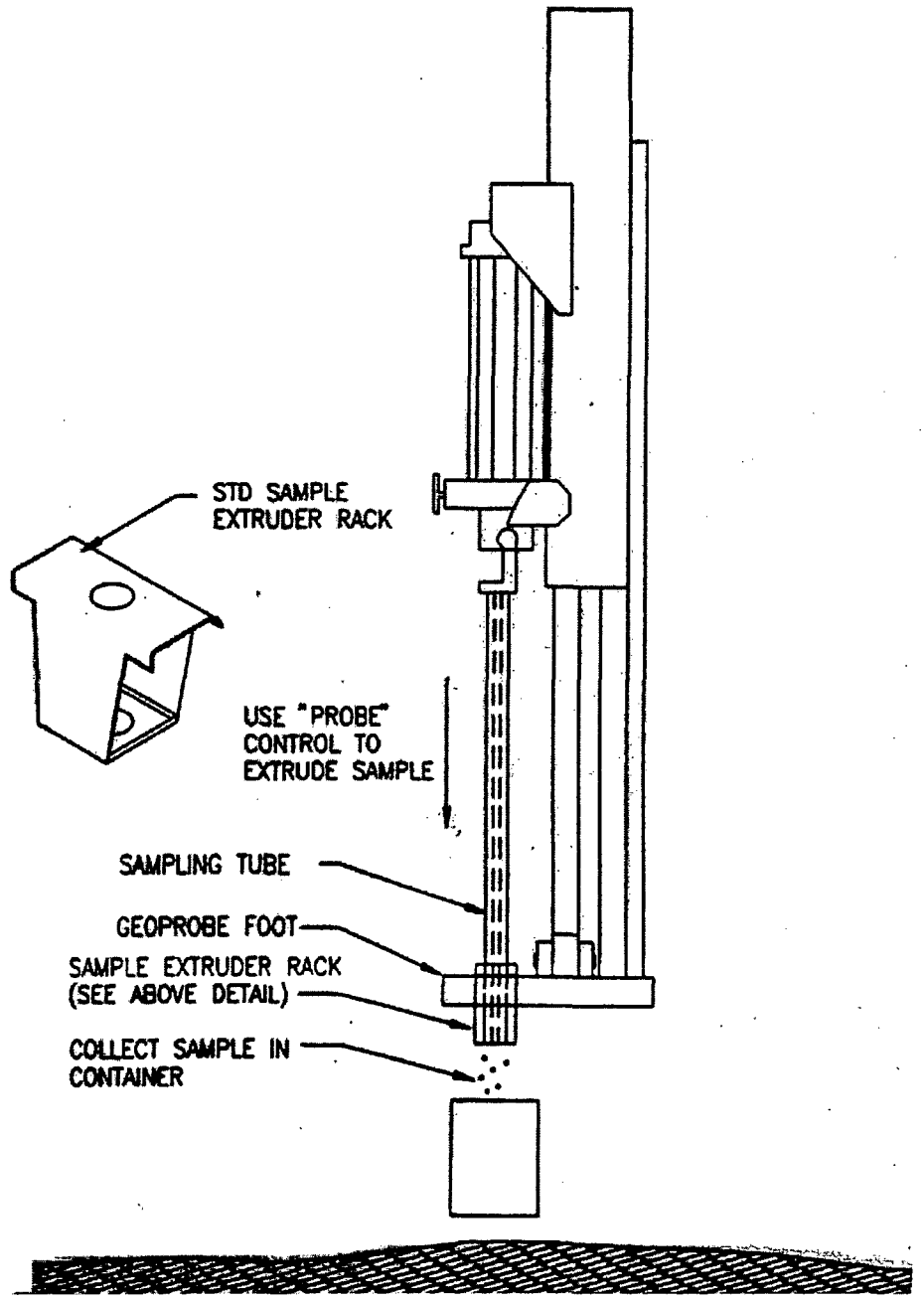
5.2 Soil Gas Sampling

Assembly

1. Assemble the sampling device as follows (Figure 3):
   - Test fit the adapter with the PRT expendable point holder or retractable point holder to ensure that threads are compatible and fit together smoothly.
   - Attach the PRT adapter to flexible tubing equal in length to the depth of sampling (with some additional for sampling activities).
   - Secure PRT adapter with a length of electrician's tape and check the condition of the O-ring attached to the end of the PRT adapter.
   - Screw the PRT expendable point holder into the bottom of the lead probe rod.
   - Attach an expendable drive point to the bottom of the PRT expendable point holder.

2. Attach the assembled sampler onto the leading probe rod. A 12-inch probe rod is recommended to start the 24-inch standard and large bore samplers.

FIGURE 2
SAMPLE EXTRUDER RACK



Probing

3. Thread the drive cap onto the top of the probe rod and advance the sampler. Replace the 12-inch rod with a 36-inch rod as soon as the top of the sampler is driven to within 6 inches of the ground surface.

4. Advance the sampler to 1 foot past the interval to be sampled using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.

Sampling

5. Replace the drive cap with a pull cap and retract the probe rods approximately 1 foot.

6. Move the probe unit back from the top of the probe rods and remove the drive cap.

7. Push the drive point out of the PRT expendable drive point holder with extension rods fitted with a ram.

8. Remove the extension rods from the probe rods.

9. Insert the adapter end of the tubing down the inside diameter of the probe rods, feeding the tubing down until the adapter contacts the top of the PRT expendable point holder.

10. Holding the out-of-hole end of the tubing, apply downward pressure while turning in a counter-clockwise direction to screw the adapter into the PRT expendable point holder.

11. Pull lightly on the tubing to ensure that the threads have engaged.

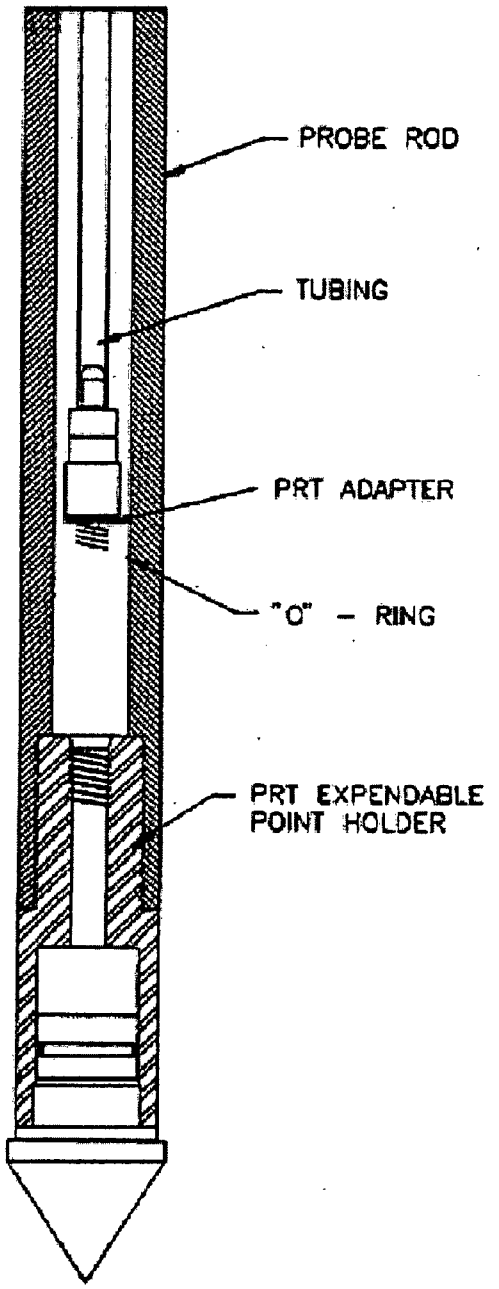
12. Connect the out-of-hole tubing to a vacuum or sampling system. A short section of inert silicon tubing may be connected to the end of the out-of-hole tubing so that a sample can be collected with a glass gas chromatograph (GC) syringe.

13. Start the vacuum or sampling system and allow the system to operate for 2 to 3 minutes to ensure that a sufficient volume of air has been run through the tubing. Document the depth, vacuum pressure, and purge duration in logbook. NOTE: Make sure the vacuum evacuation pump is able to pull vapors from the formation. Excessive vacuum may occur in clay/clayey units resulting in insufficient sample volume.

14. Collect sample using the method specified in the site-specific plan.

15. Label all sample containers as required, securing the label by covering it with a piece of clear, waterproof tape.

FIGURE 3
PRT SOIL GAS SAMPLING SYSTEM



16. Remove the tubing from the probe rods. Dispose of the tubing or set it aside for decontamination.

17. Remove probe rod(s) from hole. Leave tubing in place for longer term monitoring.

5.3 Groundwater Sampling

Assembly

1. Assemble the screen point groundwater sampler (see Geoprobe® Systems Equipment and Tools Catalog, Groundwater Sampling Tools, pp. 5.1-5.12) as follows (Figure 4):
   - Push the screen insert and plug into the screen sleeve from the bottom. The bottom end has one drain hole.
   - Push the screen connector over the top end of the screen sleeve and push the screen connector pin into place. The pin must be held in place as it has a loose fit.
   - Insert the screen sleeve, screen connector first, into one end of the sampler sheath.
   - Slide the drive point seat over the end of the screen assembly that protrudes from the sampler sheath. Thread it in until tight using a 7/8" wrench.
   - Push the screen assembly just far enough into the sampler sheath that an expendable drive point can be pushed into place in the drive seat.
   - Screw the GW drive head with the O-ring end first into the open end of the sampler sheath.
   - O-rings are installed at various critical places in the sampler assembly. Ensure that all O-rings have not been worn and that the connections made at O-ring locations are tight.

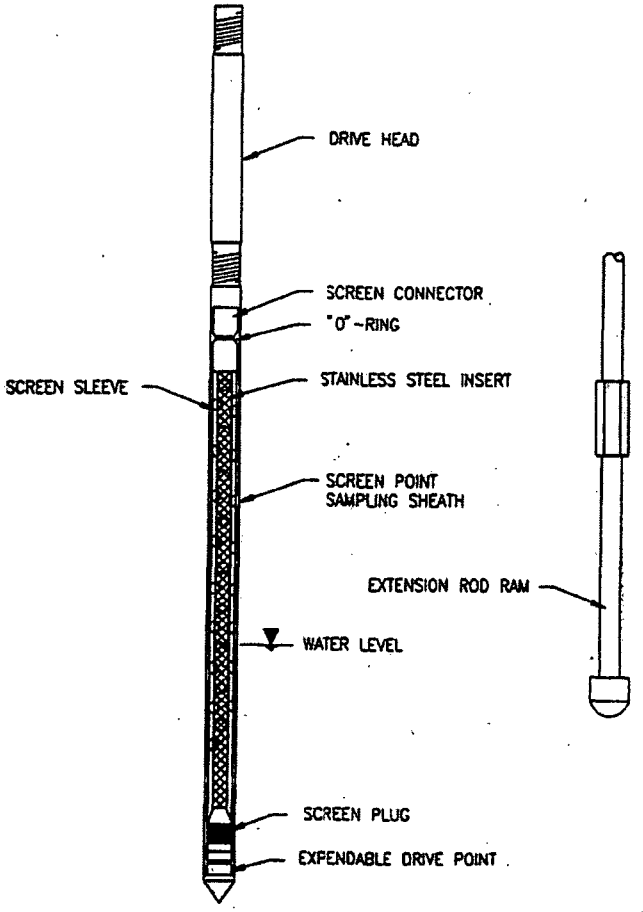
   The Mill-slotted well point does not need any assembly.

2. Attach the Mill-slotted well point, or screen point groundwater sampler, onto the leading probe rod. A 12-inch probe rod is recommended to start either groundwater sampler.

Probing

3. Thread the drive cap onto the top of the probe rod and advance the sampler using either the hydraulic hammer or hydraulic probe mechanism on the Geoprobe® rig. Replace the 12-inch rod with a 36-inch rod as soon as the top of the sampler is driven to within 6 inches of the ground surface.

FIGURE 4
GROUNDWATER SAMPLING



4. Advance the sampler to the interval to be sampled using the hydraulic hammer. Add additional probe rods as necessary to reach the specified sampling depth.

Sampling

5. Move the probe unit back from the top of the probe rods and remove the drive cap.

6. The next step varies depending on the type of sampler being used:

   - Mill-slotted well point - measure and record the water level, allowing time for the water level to reach equilibrium.

   - Screen Point groundwater sampler - attach the pull cap to the top probe rod, retract the probe rods approximately 2 feet, push the screen into the formation using extension rods fitted with a ram, remove extension rods from the probe rods, and measure and record the water level, allowing time for the water level to reach equilibrium.

7. Label all sample containers as required, securing the label by covering it with a piece of clear, waterproof tape.

8. Collect groundwater samples using one of three methods (as outlined in site-specific plans) described below:

   - Collect sample from the inside diameter of the probe rods using a decontaminated mini-bailer. Follow CDM Federal SOP 1-5 "Groundwater Sampling Using a Bailer."

   - Collect sample using a peristaltic pump and flexible tubing system.

   - Collect sample using a check valve (Waterra-type valve) attached to the bottom of 3/8-inch diameter tubing. The tubing is lowered into the probe rods below the top of the water table, check valve-end first. Water sample is collected through the tubing by rapidly oscillating the tubing up and down creating an inertion pump.

9. Clean the outside of the sample containers and place individual samples into sealable bags and seal closure.

10. Place samples in a cooler, containing ice according to SOP 2-1 "Packaging and Shipping of Environmental Samples."

6.0 RESTRICTIONS/LIMITATIONS

The Geoprobe® sampling system is not designed for collecting large sample volumes, thereby limiting the number of analytical parameters. Sample recovery rates may be reduced in soils with substantial amounts of gravel and/or cobbles. Depending on sampling depths and intervals, a typical sample production rate of between 10 and 15 samples per day can be expected.

The most efficient sampling depth is limited by the geologic and hydrogeologic conditions. Practical, efficient sampling depths should be limited to approximately 20 feet under most conditions. However, sampling depths in excess of 65 feet have been achieved in unconsolidated, homogeneous sandy soils; attainable depths will be greatly reduced in tighter formations and in soils with gravel and cobbles.

The presence of gravel and cobbles in soils will likely damage soil sampling tubes and possibly probe rods, couplers, stop-pins, and other probing equipment. A sufficient supply of replaceable equipment should be kept on site in the event of damage or breakdowns. This often requires replacement at the project's - not the subcontractor's - expense. A copy of the Geoprobe® Systems Equipment and Tools Catalog should also be kept on site; Geoprobe® Systems provides overnight deliveries.

Prior to conducting the Geoprobe® sampling event, underground utilities and structures must be demarcated on the ground surface. The local utility companies must be notified at least 72 hours prior to the scheduled sampling event to allow sufficient time to locate and mark the utility lines. The selected sampling location should be a safe distance from the demarcated utility. In some cases, records regarding utility locations may not exist. In any event, a good practice is to push the probe rods the first few feet, rather than hammering, to ensure that no utilities, underground storage tanks, or other subsurface structures are present.

7.0 REFERENCES

Geoprobe Systems, *The Probe-Drive Soil Sampling System*, September 1991.

Geoprobe Systems, *Equipment and Tools Catalog*, 1992.